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Retrieval of atmospheric CO2 from SCIAMACHY nadir spectra

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Carbon dioxide is the most important anthropogenic greenhouse gas. Its global increasing concentration in the Earth's atmosphere is the main driver for global warming. For this reason, carbon dioxide became one of the EU FP7 project Monitoring Atmospheric Composition and Climate (MACC) products. However, in spite of its importance, there are still large uncertainties on its global sources and sinks. Satellite measurements have the potential to reduce these uncertainties.

At present, there are only two satellite instruments orbiting the Earth which are able to measure the CO2 mixing ratio (XCO2) with large sensitivity also in the boundary layer. In 2002 SCIAMACHY aboard ENVISAT started the time series of XCO2 observation from space followed by GOSAT
which was launched in 2009.

Recent results of the WFM-DOAS retrieval scheme will be shown, covering world wide data from 2003 to 2009. In this context, the strength but also weaknesses of the existing retrieval algorithm will be discussed. Maybe the most important source of potential errors are undetected sub visible cirrus clouds. A new optimal estimation based retrieval scheme will be presented which has the potential to drastically reduce these errors.